PROJECT TRANSITION PLAN

FOR THE

CENTER FOR NANOPHASE MATERIALS SCIENCES

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Revision 1

Conventional Facilities Project Manager

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ACRONYMS

ACL	Acceptance Criteria Listing
CD	critical decision
CM	Construction Manager
CNMS	Center for Nanophase Materials Sciences
DOE	Department of Energy
ES&H	environment, safety, and health
GC	General Contractor
HVAC	heating, venting and air conditioning
ISM	Integrated Safety Management
NRL	Nanofabrication Research Lab
ORNL	Oak Ridge National Laboratory
SBM	Standards Based Management

1.0 Introduction

The mission of the Center for Nanophase Materials Sciences (CNMS) is to provide a user facility for the research, design, modeling, synthesis, processing, fabrication, and characterization of novel molecular and nanoscale materials. The CNMS will be a highly collaborative, multidisciplinary facility whose three major scientific thrusts will be nano-dimensioned soft materials, complex nanophase materials systems, and theory/modeling/simulation.

2.0 Organizations and Responsibilities

2.1 Department of Energy

The Department of Energy (DOE) is the owner of the CNMS and is the ultimate authority for all critical decisions concerning this project. Within the scope of this plan, the DOE Acquisition Executive will have final approval of Accepted for Beneficial Occupancy (CD-4a) and Acceptance for Operation (CD-4b).

The Federal Project Director and the ORO Programs and Projects Division Director with support staff who are separate from the CNMS Federal Project Director will perform a walkthrough of the conventional facility to make an overall assessment that the conditions for beneficial occupancy have been met.

2.2 Oak Ridge National Laboratory

The Oak Ridge National Laboratory (ORNL), as represented by the CNMS Project Team, is responsible for the overall management of the CNMS construction project and, as represented by the CNMS operating staff, is responsible for the operation and performance of the CNMS. During the transition to operations phase the Project Team will verify that the completed structures, systems and technical equipment are in full compliance with all the requirements and specifications of the CNMS design and will turn over to the operating staff a fully functional facility and the associated technical equipment.

2.3 Knight-Jacobs Joint Venture

Knight-Jacobs Joint Venture serves as the Construction Manager (CM) for the conventional facilities of the CNMS. They are responsible for the direct management and oversight of the General Contractor. They are active participants during the transition to operations phase and are responsible for demonstrating that the completed structures and systems are in full compliance with all the requirements and specifications for the CNMS conventional facilities.

2.4 Caddell/Blaine

Caddell/Blaine serves as the General Contractor (GC) for the conventional facilities of the CNMS. They are responsible for providing the labor and materials and for the performance of construction of the facilities. They are active participants during the transition to operations phase and are responsible for assisting the CM in demonstrating

that the completed structures and systems are in full compliance with all of the requirements and specifications for the CNMS conventional facilities.

2.5 Technical Equipment Vendors

Various independent vendors have provided materials, equipment, and/or services for the construction of the CNMS. During the transition to operations phase some of the technical equipment vendors will be contractually required to set up the equipment, make final connections, perform startup and testing, and demonstrate the correct performance of their products.

2.6 Transition Team

The Transition Team is responsible for verifying that the CNMS has been constructed to comply with all the requirements and specifications of the design and that the CNMS is fully mission capable. The Transition Team shall be composed of the CNMS Project Director, the Conventional Facilities Project Manager, the Technical Equipment Project Manager, members of the Technical Equipment Team (as appropriate, i.e., clean room technical equipment), the ORNL Facility Manager and appropriate members of his maintenance staff, representatives and support staff including ES&H as required by the Project Director. Membership of the Transition Team may vary as various representatives will participate only in the areas of their direct involvement. Final approval authority will reside with the CNMS Project Director.

3.0 Conventional Facilities

3.1 Scope

The conventional facilities of the CNMS include the building structures [such as the Nanofabrication Research Lab (NRL) and the CNMS offices and labs], the building support systems (HVAC, electricity, potable water, deionized water, etc.), and the grounds immediately adjacent to the buildings.

Commissioning the conventional facilities is the responsibility of the GC and shall include commissioning the clean rooms. The GC will certify the required level of cleanroom cleanliness using an independent testing service. An independent commissioning agent will oversee and independently check the commissioning of the building systems and will issue an interim commissioning report prior to CD-4A and the final commissioning report. This consists of verification of proper installation of the building systems and the utility connections.

In addition, electromagnetic, acoustic and vibration assessments will be performed after beneficial occupancy by ORNL subcontractors to determine that performance requirements have been met for field sensitive locations in the clean room area.

3.2 Beneficial Occupancy

Beneficial Occupancy of the CNMS conventional facility is required for CD-4a. Attachment A to this document lists the CNMS CF Beneficial Occupancy Definition. At CD-4A, the conventional structures of the multistory lab and office building and the NRL are complete, laboratory hoods in the multistory lab and office building are installed and operational, the clean rooms have been commissioned and certified for operation, and

the facility is ready for technical equipment hookup and testing. At Beneficial Occupancy the control of work passes from the GC to ORNL.

When the facility nears completion, representatives of the Transition Team and the Federal Project Director will periodically walk down the building and its systems to verify that they are ready to turn over for operation. Any deficiencies will be noted on a punch list. Additionally, reviews will also be conducted to verify that the required documentation has been provided, the required training has been completed, and that any required preventive maintenance has been performed. Any deficiencies will be added to the punch list. The punch list will be used to track corrective actions and insure that all deficiencies are corrected. Items may be added or deleted from the punch list as deemed appropriate by the Transition Team. The facility can be accepted for beneficial occupancy with uncompleted items on the punch list. The punch list would then be completed during the transition phase prior to CD-4B.

Individual sections of the buildings and the separate utility systems and parts thereof may be reviewed and accepted by the Transition Team at the Transition Team's discretion. If any utility system, such as sanitary water, is accepted incrementally, it must be done from the source downstream, i.e., a section that has been cleaned and tested can't be accepted unless all sections upstream have already been accepted as cleaned and tested.

The CNMS Project Director and/or their designated representative(s) have the right to observe any testing or preoperational activities, such as hydrostatic testing or initial equipment startup that they desire. Generally speaking, the CM will provide twenty-four hour notice of any testing that requires a signed acceptance.

After CD-4A the utility connections for the technical equipment must be designed and installed. This includes any wiring, piping, and connectors necessary to transfer the utility from its terminal (power outlet, switch box, pipe stub or valve, etc) to the appropriate connection on the equipment. The Transition Team will verify proper completion of this task.

3.3 Training

The ORNL Facility Manager and the appropriate discipline leads shall determine the personnel requirements for operating the conventional facilities and what training is necessary to perform those duties in a completely satisfactory manner. The ORNL Facility Manager and the appropriate discipline leads will then insure that the training has been provided to the appropriate personnel. This will include verifying that any vendor/contractor provided training is properly utilized and documented. These requirements and training will be appropriately documented.

3.4 Maintenance

The Facility Manager shall determine all requirements for maintaining conventional facility equipment and systems and what training, materials, and equipment are necessary for the identified individuals to perform those duties in a completely satisfactory manner. The Facility Manager will then insure that the training, materials, and equipment are provided to the appropriate personnel. This will include verifying that any vendor/contractor provided training is properly utilized and documented. These requirements and training will be documented and provided to the ORNL facility management group.

The Facility Manager will develop and implement a preventive maintenance program to ensure that all conventional facilities equipment is properly maintained from the time of beneficial occupancy. The program will include identification of requirements and a tracking system to document their timely and proper maintenance of equipment.

3.5 Documentation

Documentation verifying the correct construction and installation of the conventional facilities and their suitability for operations shall be provided to the CNMS Project by the CM and the vendors (as appropriate) in the project turnover files. The turnover files shall include but are not limited to the following:

- operating instructions/manuals
- maintenance instructions/manuals
- spare parts lists
- warranties
- manufacturer’s material and performance certifications
- test, compliance, and field reports
- specifications, drawings, and red line drawings
- initial building operations records including the fire safety systems checklist

Documentation may be provided during the transition phase but must be completed prior to acceptance for Operation.

4.0 Technical Equipment

4.1 Scope

The technical equipment includes the specified equipment provided as apart of the CNMS line item. This does not include conventional facility equipment such as deionizers, HVAC equipment, substations, and diesel-generator sets required for the operation of the building. Nor does this include technical equipment, such as the laboratory hoods, which were installed by the GC. The Technical Equipment List is included as Attachment B.

4.2 Acceptance for Operation

The CNMS will be ready for Start of Full Operations when the criteria for CD-4B have been met. This occurs when the transition phase is complete and the technical equipment is accepted for operation, which is defined as after correct installation of the equipment has been verified, the equipment has been successfully tested in all modes of operation, and the equipment is officially accepted.

Technical equipment shall be accepted for operation on the date that all the following activities are complete:

1. The installation is complete. All systems, parts, materials, and accessories are installed and connected to utilities according to specification.

2. All required conventional facility utility systems (chilled water, electricity, compressed air, etc) specified for operation of the equipment have been connected, tested, and provide the specified level of service in their final permanent configuration and are accepted for operation. No temporary connections remain.

3. All testing, inspection, and certification has been completed and documented as required by the ACL.

4. Any associated safety systems are fully operational.

5. All required training necessary for ORNL personnel to operate and maintain the equipment and any associated subsystems has been completed.

6. All required documentation such as operations/maintenance manuals and/or instructions that are necessary to operate and maintain the equipment and any associated subsystems have been provided.

Reviews will be conducted to verify that the required documentation has been provided, the ACL is complete, the required training has been completed, and that any required preventive maintenance has been performed. Any deficiencies will be documented and tracked to insure that all deficiencies are corrected.

The CNMS Project Director and/or their designated representative(s) have the right to observe any testing or preoperational activities, such as initial equipment start-up.

Generally speaking, the installer/vendor will provide twenty-four hour notice of any testing that requires a signed acceptance.

If necessary, the CNMS Project Director can accept technical equipment for operation on a provisional basis. This would prevent minor discrepancies from causing untimely delays. Any existing discrepancies will be noted on the provisional acceptance documention. Upon completion of all requirements and resolution of all discrepancies the equipment will be accepted for operation.

4.3 Training

The Transition Team shall determine the personnel requirements for operating the technical equipment, who will meet those requirements, and what training is necessary. The CNMS operating staff will insure that the training is provided to the appropriate personnel and is documented. The Transition Team will verify that any vendor/contractor provided training is properly utilized and documented.

4.4 Maintenance

The appropriate representative from the Technical Equipment Team shall determine all requirements for maintaining the technical equipment and any associated subsystems, who will meet those requirements, and what training, materials, and equipment are necessary. The CNMS operating staff will then insure that the training, materials, and equipment are provided to the appropriate personnel and that the maintenance is performed and documented. If appropriate, long term maintenance contracts with the vendor may be used. The Transition Team will verify that any vendor/contractor provided training is properly utilized and documented and that any vendor provided maintenance and/or warranty work is properly performed and documented.

If required by the Project Director, the appropriate representative from the Technical Equipment Team will develop and implement a preventive maintenance program to ensure that all technical equipment is properly maintained from the moment of its receipt until it is accepted for operation. The program will include identification of requirements and a tracking system to document their timely and proper completion.

4.5 Documentation

Documentation verifying the correct installation and operation of the technical equipment and its suitability for operations shall be provided to CNMS Project Director by the vendors in the technical equipment turnover files. The turnover files shall include but are not limited to the following:

- operating instructions/manuals
- maintenance instructions/manuals
- spare parts lists
- guarantees

- warranties
- manufacturer's material and performance certifications
- test, compliance, and field reports
- specifications, drawings, and diagrams (as appropriate)

5.0 ES&H

The Transition Team will identify and document the completion of specific ES&H requirements, such as Research Safety Summaries (lab-by-lab basis), identification of hazardous materials, gas detection systems in the clean rooms, identification of personal protective equipment, etc. The Transition Team will also ensure that initial CNMS operations adhere to ORNL's ISM/SBM systems. Training requirements will be established for safe operation of all equipment and associated building systems (eg, clean rooms).

6.0 Attachments

A. CF Beneficial Occupancy Definition (BOD)
B. Technical Equipment List

Attachment A
Center for Nanophase Materials Sciences
CF Beneficial Occupancy Definition (BOD)

Items Completed for Beneficial Occupancy and CD-4A

The building structures are complete. All permanent walls, floors, ceiling roofs, structural members, foundations, stairways, and elevator are installed according to specification.

All the clean rooms meet their respective clean criteria and are ready for hookup and installation of the tools and hoods.

All surface treatments (paint, carpet, tile, protective coatings, etc.) have been properly applied.

All doors, windows, lights, etc. have been installed and are functioning properly.

The fire alarm and fire suppression systems are fully operational and turned over to the ORNL fire department.

All conventional facility utility systems (HVAC, sanitary water, chilled water, electricity, lighting, compressed air, public address, etc.) internal to the building have been installed and are operational in their final permanent configuration and accepted for operation. All wiring, piping, pumps, motors, outlets, fixtures, hangers, hardware, etc. are properly installed and complete with no temporary pieces remaining.

All utility connections are complete and provide the final required level of service.

There shall be a clear path for exterior access to the facility.

Minor architectural and utility system punch list items can be outstanding at BOD.

Items Completed after Beneficial Occupancy during Tool and Equipment Installation prior to CD-4B

Outstanding Punch list items and final building cleaning will be completed after BOD.

System testing and certification of the DI Water System will occur as required supporting the start of operations. It is not beneficial to run the DI system for several months prior to operations.

Parking lot roads and parking lot lighting. Scope will be coordinated with SNS and ORNL and will be completed after BOD.

Outside planter and landscaping work. Scope dependent on the weather and the spring growing season.

Lab equipment, casework, and overhead service carriers' installations and their utility hookup. Scope is outside the CNMS General Construction Contractor's scope. Installation to occur after BOD is received from the contractor.

Office furniture installation. Scope is outside the CNMS General Construction Contractor's scope. Installation to occur after BOD is received from the contractor.

Installation of the outside nitrogen tank. This tank will be leased and installed just prior to operations.

Cleanroom tools, hoods, benches and equipment and their utility hookup. Scope is outside the CNMS General Construction Contractor's scope. Installation to occur after BOD is received from the contractor.

Servers, computers, A/V and telecommunications installation internal to the building. Scope is outside the CNMS General Construction Contractor's scope. Installation to occur after BOD is received from the contractor.

Completion of systems commissioning will be after BOD.

Some system and component training will be included as part of the punch list items for the General Contractor to be completed after BOD.

Turnover of all red-lined as-built drawings and all the required documentation such as operations/maintenance manuals and /or instructions that are necessary to operate and maintain the building and its systems will be included as part of the punch list items for the General Contractor.

ATTACHMENT B

TECHNICAL EQUIPMENT LIST

Soft Materials Characterization
Gel Permeation Chromatography (GPC) and High Temperature GPC with Light Scattering Detector
UV–Vis Spectrophotometer
Fourier Transform Infrared Spectrometer (FTIR)
Matrix–assisted laser desorption/ionization time–of–flight mass spectrometer (MALDI–TOF–MS)-benchtop
Physical characterization of polymers
Surface Analysis Equipment: Ellipsometer
Simultaneous Static and Dynamic Light Scattering Spectrometer
Nanophase Materials Synthesis And Characterization Equipment
MOPO and YAG Laser Systems
Ti-sapphire Laser
Tunable Raman Spectrometer
4-probe transport Scanning Tunneling Microscope
High–resolution Spin–polarized Scanning Electron Microscope (SEMPA)
NanoFabrication Research Laboratory
Direct Write Electron Beam Lithography (DWEBL) System
Double–Sided Contact Mask Aligner and Wafer Bonder System
Laser Pattern Generator/Mask Writer
Electron Beam Lithography and Photolithography Resist Processing Equipment and development tools
Plasma Etching and Deposition Equipment
Oxidation, Annealing, Diffusion and Low Pressure Chemical Vapor Deposition Furnaces
Thin Film Processing Equipment
Metrology and Inspection Tools
Ancillary Equipment
Nanomaterials Theory Institute
32-node Beowolf Cluster
7 SGI Graphic Workstations
16 screen video wall
General Use Equipment
X–ray Diffraction Laboratory for Multi–User Nanoscience
Focused Ion Beam (FIB) / Scanning Electron Microscope (SEM) (Dual–Beam System)
Laboratory Fume Hoods, furnishings, misc. equip.
Furniture and computers